April 1962

EMO

NATIONAL DIGEST

The House of Commons

The Attack Warning System

Civil Defence in New Zealand

Weather and Emergency Planning

Emergency Welfare Mobile Teams

EMERGENCY MEASURES ORGANIZATION

THE EMO NATIONAL DIGEST

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The EMO NATIONAL DIGEST is published bi-monthly to provide current information on a broad range of subjects dealing with civil emergency planning. The magazine is published in English and French and may be obtained by writing to the Emergency Measures Organization, Privy Council Office, East Block, Ottawa.

In addition to publishing articles which reflect Canadian Government policy the Digest may also publish articles by private individuals on subjects of current interest to the emergency measures programme. The views of these contributors are not necessarily subscribed to by the Federal Government.

Director: R. B. CURRY. *Editor:* A. B. STIRLING.

ROGER DUHAMEL, F.R.S.C.
QUEEN'S PRINTER AND CONTROLLER OF STATIONERY
OTTAWA, 1962

The House of Commons

FRIDAY, 23rd MARCH, 1962

During discussion on the supplementary estimates for the Emergency Measures Organization the Prime Minister, the Rt. Hon. John G. Diefenbaker made a comprehensive statement covering a wide range of emergency planning activities. The greater part of the Prime Minister's statement is reproduced below.

Shelter and Evacuation

Until about five years ago, if Canada had a policy, it was one of evacuation. Today it is a combined policy of shelter and evacuation. It was for that reason that we instituted the various programs and national exercises that have been undertaken.

Civil Defence in Russia

In view of the mention of the U.S.S.R. I think I should place before you something of what it is doing in this field. The possibility of a surprise attack is admitted by the Soviet authorities. However, they think that actual hostilities will be preceded by a period of growing tension. The central responsibility for civil defence was until January 1960 that of the ministry of the interior, and its responsibility was abolished at that time. The head of municipal civil defence is the chairman of the town executive committee. In each town and city actual planning is carried out by the civil defence staff of the municipality. Residential areas and educational establishments organize "self defence groups" numbering from 45 to 73 people. Groups are formed for administratively convenient units, varying from 200 persons in rural areas to 700 in densely populated urban ones. Each group consists of leaders and six teams: preservation of order, fire, decontamination, rescue, medical and shelters. They have training schools. In those schools instruction is given about the capabilities of nuclear weapons, starting with a 10-hour lecture course. They also have a further course of 18 hours which recently was brought into effect and which introduces information about fall-out. Shelters against blast, fire, radiation, and biological and chemical agents have been incorporated in basements of new buildings. Basement shelter construction started to diminish in 1955 and seems to have been abandoned in major urban centres since 1959.

Pre-attack evacuation is receiving considerable emphasis but at the same time, there has been an increase of "free standing" shelters. They have a mass training system in order to train the leaders in the various communities to take their parts.

Government in War

We have a number—half a dozen—of defence locations where government will have its place. We are not going to concentrate the members of government in any particular one. When it was originally bruited or rumoured that there was a place for government there were many, including the press, who stated that the leader of the nation should not be there; that he ought not to ask others to do that which he himself would not undertake. Arrangements were made whereby in the shelter at 24 Sussex street, which is identical in form and construction with those that we suggest for Canadians across this country, to provide for co-ordination of government among the half dozen places to which it will disperse.

We are not going to have our key people in government and the civil service concentrated in any one place. Otherwise all chance of giving leadership and administrative control to the nation might be lost by one direct hit. Some will stay in Ottawa and other places close to Ottawa will house various ministers and their departments. Full arrangements have been made, that there will be co-ordination to assure continuation of leadership to the various elements that must necessarily be considered. I want to emphasize that fact.

Responsibility of Federal EMO

The responsibility, as was said by the hon. member for Peterborough, of the emergency measures organization is to co-ordinate planning for wartime emergency not only among federal departments but with the

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provinces and through them with the municipalities. Planning in federal departments is progressing satisfactorily, with a better comprehension of functions that will have to be performed under emergency conditions. Greater attention is being given to detailed planning, both at the national and regional levels. Key officials have been designated and trained and plans prepared for the quick relocation of a small core of government personnel outside Ottawa as well as near each provincial capital city in time of emergency. I could give the records in this regard showing what is being done in that connection province by province, if it were desirable.

Regional Headquarters

Construction of permanent regional emergency government facilities has progressed on schedule and it is expected that the first four of these headquarters will be completed this summer with others being available early in 1963. In the meantime, interim facilities in all provinces have been made available on national defence establishments.

Emergency Communications

Then we come to the question of communication, which is most important. An adequate communications system has been provided to ensure continued contact with federal regional headquarters and with all provincial governments.

Orders and Regulations

Emergency orders in council and regulations, required for the continued operation of government in wartime, were tested during exercise Tocsin B and further progress is being made in improving these and correcting overlapping of authority and responsibilities wherever such things occur. The basic authority required to operate in an emergency is provided under the War Measures Act, under which orders were purportedly made, but in each case it was clearly written across the order in question that it was for exercise purposes only. In other words, it was simply the carrying out of the technique rather than the application of the act itself.

Provincial Emergency Planning

Records essential in an emergency have been selected and stored so that they will be available at all times. Equally important in providing for continuity of government is planning by the provinces and by municipalities. This planning supplements that carried on by federal departments. The cost of emergency planning by provinces and by municipalities is borne to the extent of 75 per cent by the federal government. Many hundreds of municipal emergency planning projects are approved each year. Many municipalities are engaged in working out plans for suitable emergency headquarters and are assigning functions to the key personnel who will be involved.

Army Responsibilities

In connection with the survival of people, the army's warning facilities in the form of sirens have been steadily increased and the coverage extended. The army is now studying the possibility of suitable warning devices that might be recommended for use in homes. This is a device that is activated by a signal sent over the normal electrical power circuits. The army is developing its plans for re-entry operations in damaged or heavily contaminated areas. It has made good progress in organizing survival columns and establishing target area headquarters to take control of these emergency operations.

Radiological Defence

We are now working closely with the provinces in an effort to establish suitable emergency communication plans, and through the provinces to establish municipal radiological defence organizations. These will be the means of conveying to people the information they will need about the degree of radioactive fallout to which they might be exposed, and what measures they should take.

TOCSIN Exercises

The exercise was planned to practise manning and operation of emergency government headquarters at all levels and, in particular, to test the capability for emergency government in those aspects where weaknesses were revealed in the May exercise. When I last spoke in the house on this subject I quite frankly admitted that there were shortcomings in the May exercise. I did not conceal them. We did not try to paper over the cracks in the wall. We realized that there were shortcomings and we had a further exercise based on the experience of May, designed not only to remove those shortcomings that had been ascertained earlier, but also to expand and extend the field of operation. Special informative programmes on radio and television were arranged. The provincial premiers were advised of the decision to hold the exercise and their cooperation was requested. Each and every one of them gave that cooperation very fully. The initial assessment, and this is one that has not been arrived at loosely, is that the exercise fulfilled its primary purpose.

There was some comment that it was unrealistic because of the short duration and the nature of the assumed attack. The hon. member for Peterborough

said they had not purported to use as large bombs as could have been used. I do not really get the point of that. It was the exercise and not the size of the cause of the exercise with which we were concerned.

The general purpose of the exercise was not to test the size of the instruments that would be used against us or their effectiveness. Indeed the effects of a bomb do not increase in proportion to the increase in size. The exercise was designed to test our basic arrangements for survival. We recognized that should nuclear war ever take place there may well be longer periods of attack and greater disorganization than was apparent from the exercise. Nevertheless I want to emphasize that not only we, but also those responsible in the provinces, agree that these exercises have helped greatly to develop a basic capability of ensuring that there will be in existence a frame-work of government services to provide guidance and leadership to the country.

As in the May exercise, federal participation was quite complete with maximum numbers participating. Provincial participation, especially at the senior level, represented a considerable advance over the May exercise, and reflected substantial progress in provincial planning between May and November.

To date in these exercises people generally have been requested to participate in a passive sense only. In fact, the aspect of these exercises aimed at the general public has formed a part of the over-all programme of information and education on national survival matters. It is also becoming more and more apparent that although national exercises do achieve much, it is of concern that not enough attention has been paid to the subject of municipalities. While a considerable number of municipalities, actually some hundreds, participated in the exercise, greater efforts must be directed to having municipalities participate more fully, because in the event of a nuclear catastrophe this is the level of government which will feel the first impact. Possibly by recasting our concept of exercises we could achieve more. We have therefore been encouraging provincial governments to conduct exercises within provinces whereby greater emphasis will be placed on exercising municipal governments.

During the early phases of Tocsin B in which the continent was being subjected to a combined bomber and missile attack, it was apparent that our recommendations to the public on steps they should take to ensure their survival, on the basis of public warning systems, needed some modification. A general assessment of the exercise, however, indicates that it achieved its main objectives and reflected a considerable advance over the exercise of May, 1961. Hon. members will recognize that much remains to be done to ensure that fully comprehensive plans for national survival are developed. One of the purposes of these exercises is to test the advances that we make from time to time and to direct attention to the next stage.

Mr. Chairman, I think that in general covers my statement in respect of this matter. I again say to the hon. member for Essex East and to the hon. member for Peterborough that I appreciate very much having the benefit of their views, because both have studied this matter. All hon. members who have anything to contribute to this connection will receive the fullest co-operation of the government. This is a matter that transcends partisan considerations. The survival of our people to the largest degree possible is the responsibility of government. It is also the responsibility of all our people to join together in a national spirit of co-operation for the benefit of each and all. ▲

* * *

FOREWORD TO BLUEPRINT FOR SURVIVAL NO. 5

Recognizing the need for individual and family survival plans, the Emergency Measures Organization has prepared a number of booklets known as "Blueprint for Survival". "Survival in Likely Target Areas" is the fifth in the series.

This publication is designed to assist those Canadians who live in major cities which might be target areas in the event of nuclear war. Unlike Canadians who live outside the larger urban areas, the city dweller is faced with a difficult choice—evacuation or shelter. To help in preparing a practical survival plan, the booklet examines the advantages and disadvantages of both courses in detail. Because such plans will vary according to different circumstances from city to city and from person to person, a single specific course of action suitable for all individuals cannot be recommended.

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The Attack Warning System

The following article was prepared for the CANADIAN ARMY JOURNAL *by the Directorate of Survival Operations and Plans, Army Headquarters, Ottawa.*

WITHIN THE TERMS of Privy Council Order 656 of 1959 and pursuant to the Civil Defence Order of 1959, the Minister of National Defence has been charged with the responsibility of exercising certain powers, duties and functions in connection with national survival. These responsibilities included:

"Provision of technical facilities and operation of a system to give warning to the public of the likelihood and imminence of attack".

The Privy Council Order further specified that these various duties and functions would be assumed by 1 September 1959. The Army was designated the responsible agency within the Department of National Defence for the establishment and operation of the warning system.

It is reasonable to assume that the air threat facing Canada today is not necessarily the one that will apply tomorrow or next year, and, that the threat is changing both in regard to its potential for destruction and in types and speeds of weapon delivery over long distances. A warning period of up to three hours might be expected of manned bombers capable of carrying a thermonuclear weapon long distance, from the time they penetrated our outer perimeters of tactical warning. In the case of the intercontinental ballistic missile, the period of warning might be twenty minutes or less from its points of original detection to reach its target. Submarine-launched missiles may shorten this time to as little as five to ten minutes.

Any warning system designed to prove effective in the light of a manned bomber attack would be of relatively little value if it could not be adapted to the speed of delivery of the weapons by missiles. This condition necessitates that for reasons of efficiency and economy, a system developed to meet today's demand must be capable of conversion to cope with the needs of advancement in weapons with a minimum of redesign.

Deterioration of international relations which could lead to a future conflict may be apparent and thus provide a measure of strategic warning. Within the current and future means of waging war strategic alerts may not occur. Even under optimum circumstances it is unlikely that strategic warning will provide exact data on just when an attack against North America will take place and the locations on which it will be centered.

We may, however, expect to secure a measure of tactical warning from many agencies concerned with the active air defence of North America, including:

The outposts of the Dew Line;
Picket ships in the Atlantic and Pacific oceans;
Airborne radar patrols;
The Mid-Canada Line; and
Radar stations of the Pine Tree Line.

Early warning information gathered by these various agencies is centralized at the heart of the North American Air Defence System located at HQ NORAD in Colorado Springs, U.S.A., and the active air defence battle is coordinated from this location. HQ NORAD Region Combat Centres are sources of up-to-the-minute tactical information once the attacking force comes within range of contiguous radar coverage provided by the Pine Tree Chain. The complete information required to alert the general public with a maximum of warning time is only available at HQ NORAD. Supplementary moment-to-moment information of aircraft movements can be obtained from HQ NORAD Region Combat Centres, when the attackers are approaching our more populated and industrial areas. In considering the establishment of a system capable of warning the Canadian public and to ensure that the latest information concerning enemy aircraft movement over our areas of primary interest is maintained, it is necessary that the activities centered at

HQ NORAD and HQ NORAD Region Combat Centres be closely monitored by the warning system staff.

The decision to declare a national alert affecting the country at large cannot be undertaken without regard to the impact on commerce, industry and the public as a whole. Such a decision rests with the Federal Government and can only be made on the basis of evaluated information both strategic and tactical. Procedures and communication links must be established to ensure that these vital elements are available with the minimum of delay—and, that once such a decision has been made at the Federal level, warning is conveyed to the lowest levels of the population as rapidly as possible.

Whilst the Army is responsible for the dissemination of warning to the general public across the nation, provincial government authorities control their own Civil Defence organizations. These organizations operate under the control of appropriate Provincial Ministers and in a number of cases certain responsibilities have been decentralized to geographical zones. To provide for coordination between military and provincial agencies engaged in national survival and Civil Defence activities, it is necessary to provide a centre of operations within each province to permit the closest coordination between warning activities and related Civil Defence instructions to the public.

Gaining the attention of the general public at all hours of the day or night with any degree of effectiveness presents a major problem, and in a country covering vast distances, such as Canada, its solution presents certain additional difficulties. Sirens are still considered to provide the most direct method of alerting the population but the amount of information that can be transmitted by this means is limited to simple signals produced by either steady or wavering tones. Sirens can, however, convey an urgent message and in addition to producing descriptive signals for "Alerts" and "Take Cover", their soundings provide a positive means of directing the population to tune to radio stations for instructions in an emergency. In those areas where installation of a siren system is not feasible, local resources such as whistles, alarm bells and other devices may be pressed into service to alert the public.

The varying elements, functions and actions previously outlined must be linked into a complete system if effective warning is to be achieved. Networks capable of handling high priority traffic are of primary importance and the warning systems reliability can only be as good as its communications. These needs vary at the different echelons and agencies of the warning chain but can be related primarily to the degree of speed, required clarity, volume of traffic and type of functions being performed. Networks linking primary sources of warning and tactical air battle information with the Federal and Provincial Warning Centres must provide rapid and accurate communications with a written record which will remove any doubts from the minds of persons on the receiving end. A full-time teletype network meets these demands and can be "backed-up" by military radio. Teletype lends itself to further adaption later to meet the needs for increased traffic speeds as the threat develops. The Canadian Army's National Survival Attack Warning System employs a teletype network as its primary means down to Provincial Warning Centres. Provincial Radio Broadcast Networks employing "voice" transmission circuits will emanate from Provincial Warning Centres to provide wide coverage for dissemination of warning and Civil Defence information within the provinces. The use of police, fire, utility and other government radio networks as a means of providing these "back-ups" are being explored with a view to their incorporation within the system.

The Army assumed responsibility for the National Survival Attack Warning System on 1 September 1959. Federal and Provincial Warning Centres have been established, Canadian Army personnel are located at HQ NORAD and at appropriate NORAD Region Combat Centres. The system is manned on an around-the-clock basis. The primary communications system is fully operative and is manned and functioning at this very moment. The programme of siren installations is continuing and provincial broadcast networks have been established. In brief, the system is established and is constantly being improved and expanded. This is an extensive project and it must be completed to ensure the warning of the nation in any future conflict. ▲

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Results of Teak and Orange Nuclear Test Explosions

DURING the Hardtack nuclear weapons test series in 1958, Joint Task Force 7 (composed of personnel from the Department of Defense, Atomic Energy Commission and their contractors), conducted a weapons effects programme to obtain information on the effects of nuclear detonations at high altitudes. The programme was carried out in coordination with the Atomic Energy Commission.

To achieve the objectives of the programme, two high altitude shots were fired in the vicinity of Johnston Island, approximately 700 miles southwest of Honolulu, Hawaii. The first shot named Teak was detonated on July 31, 1958, at 11:50 p.m., Johnston Island time, at an altitude in excess of 200,000 feet; the second shot named Orange was detonated at an altitude of about 100,000 feet on August 11, 1958, at 11:30 p.m. The nuclear devices were carried aloft by missiles, and were the first megaton devices ever detonated in the stratosphere by the United States.

As on all Department of Defense weapons effects shots, a number of measurements were made including those of blast, thermal radiation, and electromagnetic effects. Some of the results obtained from the Teak and Orange shots are discussed in the following paragraphs.

Aurora and visible effects

With respect to visible effects, Teak and Orange were by far the most spectacular shots ever fired by the United States. Teak produced a bright fireball which grew rapidly and immediately started to rise at a rate of approximately ½ to 1 mile per second. An aurora developed from the bottom of the fireball and spread rapidly to the north. The fireball reached a diameter of approximately 11 miles in 0.3 second and a diameter of better than 18 miles in 3.5 seconds. The fireball glowed brightly for about 5 minutes. The fireball of the Orange shot developed much more slowly, and the aurora, which was somewhat less pronounced than Teak did not appear until the fireball had risen.

Thermal radiation effects

The intensity of thermal radiation (heat) from the Teak explosion, measured on the earth's surface at Johnston Island, was insufficient to produce first degree (least serious) burns in human beings.

For the Orange shot, no thermal radiation measurements were obtained due to cloud cover that existed at detonation time.

The programme to measure thermal radiation from the Teak and Orange shots included a biomedical project using rabbits to investigate the hazard of burns to the retinal tissues of the eye.

For many years the clinical phenomenon of retinal damage caused by the radiant energy of the sun has been known and numerous cases have been documented. Most of these cases have occurred while watching solar eclipses without eye protection; thus, this type of retinal lesion has become known as eclipse blindness. Since the fireball of a nuclear detonation attains internal temperatures comparable to that of the sun, the predicted thermal energy release is of sufficient magnitude to cause concern about retinal damage in human beings who view nuclear detonations without proper protection. In order to receive permanent serious impairment of vision from a high-altitude burst, an individual would have to be looking directly at the nuclear detonation at the time of burst.

From previous tests at the Nevada test site and the Eniwetok proving ground, the thresholds for retinal damage has been generally established for detonations at or near the earth's surface.

The primary objective of the Teak and Orange biomedical project was to determine the extent of retinal damage caused by exposure to a high-altitude, high-yield nuclear detonation. Rabbits were placed at distances up to 300 nautical miles from the point of detonation in order to obtain the necessary data.

The biomedical project showed that a very high altitude nuclear explosion can be particularly damaging to the eye because of the rapid rate at which the power pulse delivers thermal energy and the relatively low atmosphere attenuation encountered. A high-altitude detonation in the megaton yield range, such as Teak, delivers a great percentage of its thermal energy during a small fraction of a second after the detonation. Consequently, with a blink-reflex time of just over a quarter of a second for the rabbit and less than a quarter of a second for man, nearly all of the radiant exposure from a very high-altitude burst is received by the retina before the eye can be protected by blinking if the person

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Civil Defence In New Zealand

The following comprehensive outline of Civil Defence activities in New Zealand was prepared for the DIGEST by H. N. Ballinger, Ministry of Civil Defence, Wellington.

In April 1959 the Ministry of Civil Defence was set up under the responsibility of a Minister of Civil Defence. This was done in accordance with the recommendations in the White Paper on Defence presented to Parliament in 1958. Plans for action in major earthquakes, which is an ever-present threat in New Zealand, were already in existence, and emergency precautions against possible air-raids had been instituted in World War II.

Civil Defence in New Zealand is patterned on the United Kingdom and Australian schemes with suitable variations to adapt them to New Zealand conditions. It is designed to cope with major peacetime disasters as well as wartime hazards.

Organization

New Zealand's civil defence organization is based on the Ministry of Civil Defence, including Regional Commissioners as key officials of the Ministry at regional level, local Civil Defence Corps controlled by local authorities, and a number of other services in liaison with these organizations and officers.

(a) *National Level*: The Ministry of Civil Defence is a unit of the Department of Internal Affairs, the Minister of Internal Affairs and the Secretary for Internal Affairs are also respectively Minister and Director of Civil Defence. Currently the Hon. F. L. A. Götz is Minister of Civil Defence and Mr. J. V. Meech, Director of Civil Defence. The Ministry is responsible for overall national planning and for preparation and supply of training and organizational publications and aids.

The operational role of the Director and his central staff in peacetime disaster or war emergency would be to advise the Government and to provide a secretariat for a Government Operational Centre, which would co-ordinate civil defence action on a national scale.

(b) *Regional Level*: Regional Commissioners, of whom there are at present three, have the duty, with the help of Regional Headquarters made up of senior officers of key Government Departments and a Fire Service Officer, of preparing and organizing regional plans. In peacetime disaster and war emergency, they will have operational responsibilities in bringing support to stricken areas within their regions and in dispersal measures.

In normal times Regional Commissioners advise and help local authorities with the planning and setting up of local Civil Defence Corps units and are responsible for the general co-ordination of local schemes.

The regions of New Zealand are the Northern Region, the northern half approximately of the North Island, with headquarters at Auckland; the Central Region, the remainder of the North Island, with headquarters at Palmerston North; and the Southern Region, which comprises the whole of the South Island, with headquarters in Christchurch. The Regional Commissioners of these three Regions are respectively, Captain L. P. Bourke, O.B.E., D.S.C., R.D., Sir Geoffrey Peren, K.B.E.; and Brigadier J. T. Burrows, C.B.E., D.S.O., E.D. There is also an Assistant Regional Commissioner in the Southern Region, Major R. G. Aitken. The Regional Commissioners meet regularly in conference at national headquarters for discussions on problems relating to the overall civil defence planning.

(c) *Local Level:* The organization of Civil Defence Corps is the responsibility of local authorities, either acting individually or in groups. They comprise five sections under the direction of a Local or Group Controller, namely Headquarters, Warden, Rescue, Casualty and Welfare. Services in liaison are the Armed Services, certain Government Departments, fire services, hospitals and relevant public utilities and services.

Functions of Sections

The Headquarters section comprises control staff above the level of Warden. It has a Communications Subsection and a Reconnaissance Subsection. The

Reconnaissance Subsection has the duty of radiation and other detection prior to the deployment of civil defence forces, including fire services and other services in liaison, into a damaged or suspect area.

The Warden Section comprises Sector Wardens, Wardens who would be attached to Warden Posts (including Patrol Wardens), and assisting staff. The Wardens are responsible for local investigation and reporting (including some local radiation monitoring), for organizing local self-help parties, and for deploying other civil defence services to the community.

The Rescue Section is responsible for the rescue of people from damaged buildings and from debris. As in the United Kingdom, the recommended prescription is that rescue parties should consist of a leader, deputy leader and six other men, equipped with items of rescue equipment in man-packs, heavier and specialized equipment being brought forward in vehicles suited for this task. Improvisation of equipment used ordinarily by contractors and public utilities is envisaged.

The functions of the Casualty Section comprise casualty collection and ambulance duties, including first aid where necessary. This type of emergency work has been highly developed in New Zealand by a number of voluntary organizations.

The Welfare Section has important functions including evacuation, billeting, emergency feeding, supply of clothing, the operation of local information centres, and general transport. (Sections of local Civil Defence Corps will be responsible for their own transport.)

National planning also envisages industrial civil defence units in establishments having sufficient employees. These would follow closely on the United Kingdom pattern.

Membership

Membership of the Civil Defence Corps is voluntary and is open to all suitable applicants. Local authorities are encouraged to rely in considerable degree on the participation of voluntary aid organizations. By these means, it is hoped to lessen the difficulties associated with the setting up of a new organization. Interest should also be easier to maintain, since the traditional functions of the voluntary aid organizations are complementary to their association in civil defence. The national organizations interested in first aid, welfare and other aspects of emergency are in fact, unfailingly co-operative in the civil defence preparations generally.

Progress

On the inception of the Ministry of Civil Defence, it was decided that the best way to approach the problem of setting up a country-wide organization would be by formulating general plans followed by the establishment of local Civil Defence Corps. To assist in the initial planning the Ministry set up advisory committees comprised of key personnel from Government Departments and interested national bodies and associations. The committees advise on certain aspects of planning, technical matters, and training procedures.

In June 1960 the Regional Commissioners were appointed, and have since that time been conferring with local authorities throughout the country. The response to this approach has been good and most local authorities have either set up an organization or have undertaken planning to that end. Some of these organizations have staged successful exercises in their areas. It is expected that further exercises will be held as other local Corps reach operational strength and their training progresses.

Training

A number of key personnel from the Ministry of Civil Defence, other Government Departments and the Armed Services have, by the courtesy of the Australian Federal Government, attended the Australian Civil Defence School at Macedon, Victoria. The specialized knowledge so gained is proving highly valuable in the national planning and in the preparation of training material.

Instructional courses for local Controllers have been commenced as part of the training programme arranged by Regional Commissioners.

Arrangements have been made for the provision of training in first aid and home nursing by the Order of St. John and the Red Cross Society.

Publications and Equipment

The Ministry of Civil Defence has produced and issued to local organizations and through the Regional Commissioners the following publications:

Civil Defence in New Zealand.
Instructions for the Setting Up of a Local Civil Defence Organization.
The Warden Section of the Civil Defence Corps.
The Casualty Section of the Civil Defence Corps.
Light Rescue.
Training of the Civil Defence Corps in First Aid and Home Nursing.

Further instructional material is to be prepared as circumstances warrant. When the majority of local schemes have been planned, it is intended to issue a householders' handbook containing information for the guidance of the public in an emergency. The preparation of a civil defence guide for rural areas, suitable to New Zealand conditions including farming practice, is also being considered.

United Kingdom manuals, where applicable to New Zealand circumstances, have been purchased in bulk and distributed. In this way, much time has been saved both in research and production. Publications received from the Canadian and United States authorities also provide much useful information.

Identity passes and arm bands have also been supplied by the Ministry of Civil Defence. Quantities of stretchers and emergency cooking equipment previously held by the Armed Services have been distributed and the availability of further suitable items is being investigated.

Legislation

At present legislative authority for local authorities' measures is given by the Local Authorities' Emergency Powers Act 1953. The more intensive developments of recent years have shown the necessity for a further definition of powers at national, regional and local level in situations arising from natural disaster and wartime emergency. A Bill was introduced into Parliament in 1961 and will be further considered this year when interested authorities and organizations have had an opportunity of expressing their opinions. ▲

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FALLOUT IN CROPS

Saskatchewan scientists are trying to find out if they can reduce the amount of radioactivity absorbed by crops.

Contamination of crops occurs as the result of fallout from nuclear explosions. One of the main radioactive elements is strontium-90, harmful to the body if absorbed in large enough quantities.

So far, there has been little to suggest that the amounts taken up by plants and thus passed to humans are significant enough to cause concern. However, no one knows for sure what a safe intake is and therefore scientists are interested in minimizing as much as possible the amount that might enter the body.

Prof. C. C. Lee of the University of Saskatchewan, working under auspices of the university and the Saskatchewan Research Council, is investigating the possibility that the amount of strontium-90 absorbed by plants might be diminished through the use of proper fertilizers.

One finding is that use of monocalcium phosphate results in a statistically significant decrease in the amount of radiostrontium absorbed by Thatcher Wheat grown in experimental pots of Saskatchewan Oxbow loam soil.

However, it's not yet known whether results would be as meaningful with other grains grown in other soils.

Prof. Lee's aim has been to find fertilizers that will make strontium-90 less available, and therefore less likely to be absorbed by plants.

He has found that calcium or nitrogen alone or a combination of nitrogen and phosphate as ammonium phosphate are not very effective. The use of a combination of calcium and phosphate such as monocalcium phosphate, appears to be promising.

(*Financial Post*, April 7, 1962)

Results of Teak and Orange—*Continued from page 6*

is looking directly at the burst at the time of detonation. This is in contrast to low altitude detonations of the same size, where the power pulse is much slower in overall delivery of its thermal component and where the blink reflex can provide a measure of protection.

Small retinal burns were produced in the rabbits at distances up to 300 nautical miles. Burn diameters consistently correlated with distance from the burst, with progressively smaller lesions being encountered at increased distances. For example, the burn lesions were approximately 2 millimeters in diameter at about 40 miles distance, decreasing to 0.5 millimeters at 300 miles. Corresponding lesions of smaller diameter might be expected at larger distances provided the burst height were great enough to allow a direct view of the fireball over the edge of the horizon. Curvature of the earth will cause the position of the fireball to be below the horizon, and therefore incapable of inflicting retinal damage.

In order to preclude damage to the sooty tern, a large bird indigenous to the Johnston Islands, special precautions were taken during the Orange shot. A water spray simulated rain and kept the birds grounded. Smoke together with local clouds further attenuated thermal effects.

No precautions were necessary for the Teak shot due to its higher altitude. The protective measures for the Orange shot were successful. ▲

The Post Office Emergency Planning Programme

The following article was prepared for the Digest by W. C. Tedford, Emergency Planning Office, Post Office Department.

EMERGENCY PLANNING for the Post Office Department is based upon the development and coordination of a widespread network of services which could be quickly brought into operation to cope with emergency conditions.

Postal Service

At first thought one might wonder just where the Post Office entered into emergency planning. While rain, hail . . . etc., will not deter the postman in his appointed rounds, he could be forgiven for not venturing forth in nuclear fallout. The role of the Post Office would be played in the period following the "All Clear" when everyone would be wondering about the welfare of members of his family and preparing to rebuild their lives.

A primary function of the Post Office from the point of view of the public will be the distribution and delivery of two postage free postcards.

Both the postcards are for use only for Civil Defence purposes in time of war and will be obtainable free at Welfare Registration Points and at Post Offices.

Morale Boosters

This card designated "Safety Notification Postcard" is to be completed and mailed immediately after evacuation or attack, to any person who may be concerned about one's safety. The "Emergency Change of Address Postcard" is to be forwarded to the Postmaster of the city or point of one's pre-emergency address and will bear the previous and present addresses.

It is extremely difficult for many Canadians to visualize the conditions which would exist after an attack and why these cards are necessary. War veterans and those who have experienced the devastation of previous wars realize the chaos which exists when roads are destroyed, all types of ordinary vehicles stalled, telephones and electricity out of commission, and food, clothing and medical supplies limited. In nuclear warfare, to all these difficulties is added the all-pervading danger of contamination by nuclear fallout which could delay recovery operations, days or weeks.

In such conditions, travel might be prohibited to all but officials performing essential tasks, which could include those giving rudimentary mail service.

These cards are intended to provide answers to vital questions confronting people after an attack. "Where is my family?" "How are they?" The father of a family may be obliged to take shelter or be evacuated from the site of his job; his wife may seek refuge in the home fallout shelter or perhaps with a neighborhood group and the children taken care of by their various schools. As a result, members of families may find themselves detained at widely scattered points with no knowledge of the welfare of loved ones. In such circumstances the Post Office would be providing a vital morale-building service by delivering to a mother the pink safety card with the message "we are safe and can be reached at ....." from her children.

The success of the "safety" card in devastated areas would depend on the immediate completion of the "change of address" card by former residents of these points.

Postal Planning

The Post Office emergency planning programme must make provision for prompt and efficient handling of the two cards and the delivery of letter mail and necessary medical supplies.

This entails elaborate background organization so that the Post Office may be able to provide the best possible postal service under whatever circumstances prevail.

Bearing in mind that large cities are to be considered likely targets, arrangements must be made for the relocation of their Post Offices and resumption of service with a minimum of delay.

It would be necessary to cope with such hazards as absence of regular staff, lack of equipment and limited transportation facilities. There must be some provision made for continuity of the lines of responsibility in the event of casualties: preservation of necessary records and alternate accommodation and transportation facilities.

As the time, place, type and extent of a possible attack cannot be foretold, all emergency measures must be planned on a nation-wide basis to cope with any eventuality.

It has already been announced that the Post Office is one of the Federal Departments to be represented in the Emergency Government. The Post Office Department must, therefore, be prepared to play its role at central and regional levels.

Plans must be formulated for the postal service to function on a regional basis until it is possible to establish communication with Headquarters. The service may even be required to operate on a Provincial, district or perhaps a Post Office basis to serve patrons. Some or all of these activities may have to be carried on from relocation points.

These are but a few of the considerations facing the postal planners. Detailed plans are being made not only to handle emergency postal service but also to coordinate these activities with the emergency operations of other Departments and Agencies.

Fallout Reporting System

At certain points where other agencies are unavailable, Postmasters have been called upon to assist the authorities responsible for determining the location of explosions and the pattern of fallout and for providing due warning. These Postmasters are being trained and equipped by the Canadian Army.

National Survival Exercises

In order to test the extent of our preparedness the Post Office Department has actively participated in the last three national survival exercises with representation from headquarters and district offices.

These exercises have enabled the Post Office representatives to evaluate their departments emergency plans and to study those areas of operation which require improvement.

In the words of the Postmaster General "National Survival Exercises provide the necessary experience which might well save many lives and prevent chaos during an active emergency." ▲

* * *

Frank B. Ellis, Director of the Office of Emergency Planning, in the Executive Office of the President, (formerly the Office of Civil and Defense Mobilization), said that President Kennedy's action in reconstituting this agency is of historic importance.

Here is the text of President Kennedy's statement issued at Hyannis Port, Massachusetts, on September 22, 1961, upon signing the bill that changed OCDM to OEP:

> "I have today approved H. R. 8406, a bill 'to change the name of the Office of Civil and Defense Mobilization to the Office of Emergency Planning.'
>
> "Effective August 1, I assigned to the Secretary of Defense major Federal responsibilities for civil defense. The remaining responsibilities can more accurately be described as emergency planning functions, for they deal with responsibilities for investigations, advice, coordination, and policy formulation in connection with our preparedness effort.
>
> "These functions of the Office of Emergency Planning may be of critical importance to our very survival. The national security requires that there be soundly conceived and well-tested plans for every emergency.

(*Information Bulletin* Office of Emergency Planning)

The Next Five Years

The following statement on Civil Defence in the United Kingdom was made by the Right Honourable Harold Watkinson, Minister of Defence, and appeared in a paper presented to Parliament during February, 1962.

OVER THE NEXT five to ten years it is clear that Civil Defence will play an important part in maintaining the general preparedness of the whole nation for any emergency. In the report on defence for 1961 it was stated that the Government had reviewed home defence plans and concluded that some additional expenditure was needed to secure a balanced programme over the next few years. These plans have to cover a wide field, and are an integral part of our defence preparations. Departments are actively engaged in implementing a revised programme. Next year will be its second year, and the estimated home defence expenditure of civil departments will be £19.37 million compared with £18.61 million for the current year.

Among the preparations which will be advanced, the scheme of emergency control will be further developed, and emergency radio communications will be provided. For the warning and monitoring organization, a new system for rapidly passing messages over the telephone is being installed, arrangements are being made for the B.B.C. to supplement other warning channels, and a start is being made with the provision of special equipment and radio communications. Stocks of emergency equipment for maintaining drinking water supplies are being increased. Stockpiling of radiac instruments for essential services will continue, and further training equipment will be provided for the Civil Defence Corps and the Auxiliary Fire Service.

There have been a number of joint civil/military exercises in order to test plans for military aid to the civil power, and joint planning for this purpose is continuing.

An examination of the functions and organization of the Civil Defence Corps and the Auxiliary Fire Service has been carried out, and the Government now propose to discuss with the local authority Associations certain changes designed to make the Corps and the Auxiliary Fire Service better able to discharge their role. The strength of these Services on 31st December last was over 395,000 compared with just under 380,000 on the corresponding date in 1960.

The Government have reviewed dispersal policy in the light of developments in the strategic situation over recent years, and have had consultations with the local authority Associations. They have concluded that although the circumstances that might precede an attack upon us cannot be foreseen, it is necessary to have available a scheme which could be implemented, if it were thought right to do so, for dispersing mothers and children and other people in priority classes from major centres of population. The detailed application of the scheme will be worked out with the help of local authorities. ▲

* * *

"... In short, we must maintain carefully balanced forces to deter every form of aggression and military threats. The Government do not believe that major war could long continue without one side or the other resorting to nuclear weapons. It is therefore the prevention of war that is vital rather than preparations for long drawn out conventional war."

(*Right Honourable Harold Watkinson*)

Emergency Welfare Mobile Teams

Prepared for the DIGEST by the Emergency Health Services Division, Department of Health and Welfare.

THE EMERGENCY WELFARE SERVICES are responsible for the emergency needs of people through the five Services—Emergency Clothing, Emergency Lodging, Emergency Feeding, Registration and Inquiry and Personal Services.

These Services are provided to people in need of them through Welfare Centres. For those people who are unable to come to the Centres, the Services are taken to them by Mobile Teams.

Functions of Mobile Welfare Teams

There are four types of Mobile Welfare Teams which would fulfil one or more of the following functions:

(1) Provide minimum welfare survival assistance to those being rescued in support of the Army and Emergency Health Services.
(2) Provide Welfare Services in slightly damaged areas where no Welfare Centres have been previously planned for or organized.
(3) Provide assistance to those individuals in institutions and under Emergency Health Services care who are physically unable to go to a Welfare Centre.
(4) Supplement the staff at existing Welfare Centres faced with an increasing number of evacuees or for other reasons in need of reinforcement.

Organization

(1) *Complete Mobile Teams*

Complete Welfare Centre Mobile Teams (consisting of five separate mobile teams—Clothing, Lodging, Feeding, Registration and Inquiry, and Personal Services) would set up and operate a Welfare Centre. This service might be required by people who remain in a slightly damaged area. For planning purposes this team should be capable of providing basic E.W.S. to approximately 2,000 evacuees in a Welfare Centre Area.

(2) *Self-Contained Emergency Clothing Team*

Self-contained Emergency Clothing Teams should be capable of providing emergency covering (a blanket or a coat) to approximately 300 evacuees at decontamination and/or evacuation centres during the period of re-entry operations. A team of two key workers would be sufficient to operate this mobile service. Additional help would be recruited from volunteers and evacuees on the spot as required. One three quarter or one ton panel or delivery van type truck would be required by this team.

(3) *Self-Contained Emergency Feeding Team*

This team should be capable of feeding 500 people within a period of 2-4 hours (depending upon the type of food prepared, i.e. a hot drink or a one-dish meal). Such a team would be set up to operate continually on this basis if need be during re-entry operations. Although mobile feeding units would be used, some additional feeding units might have to be improvised locally in some instances. Adequate preparation, cooking, serving and eating equipment is contained within the mobile feeding units. These are now being stockpiled for operational purposes. Food and water supplies should be carried by the team for the initial feeding of 500 people. For continuous operation, one supervisor and three experienced key workers per shift would be required. Additional workers as required could be recruited from the evacuee group.

(4) *Registration and Inquiry Team*

A mobile team would be required to go to regular and emergency hospitals to transfer information recorded on hospital logs to Registration Cards and to make out Inquiry Cards for casualties if requested. A team would also go to any evacuated welfare institutional group which had been accommodated in any given Welfare Centre Area. The team consisting of two workers would require a vehicle if the reception community covered a wide area.

Every Welfare Centre should plan to provide Mobile Welfare Teams. They would be a part of the organization of the Welfare Centre. The Welfare Centre Manager should have the overall responsibility for the formation of the teams, for staff reinforcements and for arranging for the provision of supplies, equipment and transport during the period of operation. The team leader would therefore be responsible to the Welfare Centre Manager.

Supporting Services

Supporting services are provided from the Army, Transportation, Communications, Supply and Engineers.

Training and Operations

In order to ensure the operational effectiveness of such Mobile Teams in disaster, the Emergency Welfare Services Organization at municipal, zone and regional levels should plan for and conduct increasingly ambitious exercises in conjunction with the other Civil Defence/Emergency Measures Services involved in rescue operations.

Who Should Be Responsible for Organization and Operation of E.W.S.

Provincial and Municipal Departments of Public Welfare, where they exist, are the logical bodies to assume the overall responsibility for developing provincial and local E.W.S. The success of Emergency Welfare Services in Welfare Centres and through Mobile Teams alike depends upon the leadership ability and the training of the key people involved.

The Federal E.W.S. Division of the Department of National Health and Welfare provides leadership training (at the Canadian Civil Defence College in Arnprior) for key personnel from the provincial and zone levels. Provincial and municipal government should assume responsibility for training the E.W.S. workers who are responsible from the zone level to the level of the municipality for the carrying out of Welfare Centre and Mobile Teams operations at the local level. ▲

* * *

From a Statement by the Hon. Steuart L. Pittman,
Assistant Secretary of Defence, Civil Defense, Washington D.C.

"... People in larger cities may, under some assumptions, be exposed to much greater risks than the rest of the population. If it were practical to move urban populations far enough underground, something approaching security might be brought to the cities. Lacking the opportunity to provide any complete security, it should be understood that the President's programme does a great deal to increase the chances of survival in small and large cities. In the first place, the chances of many cities being covered by blast, heat and fire are uncertain. If passed up by the direct effects of the explosion, the surviving population could be exposed to slow death and intense sickness caused by radiation from fallout. A programme designed to take advantage of larger buildings for fallout protection is increasingly effective as the size of cities go up and the number of heavily constructed, high-rise buildings increases. In short, the larger cities can provide excellent fallout protection at relatively low cost for large numbers of people. Our programme is designed to take advantage of this resource. Furthermore, large buildings offer a significant amount of protection against blast and heat. Data developed from Hiroshima is surprising in the extent of survival of people relatively close to the point of detonation—under heavy blast and a fire storm —who were protected by substantial buildings. This is not to say that our programme would protect cities and other areas which turn out to be within the circle of destructive blast and heat; but the odds of survival even in cities and military target areas will be improved by fallout shelter space, marked, stocked and understood."

Civil Defence In Germany

by

Horst Von Zitzewitz

The following article first appeared in The Association of Civil Defence Officers Journal, *February, 1962.*

IF A REPORT is to be made in a technical journal of this province, concerning the present position of Civil Defence in the German Federal Republic, a few preliminary remarks would seem to be indicated.

The German idea of "Zivile Verteidigung" is not synonymous with the British "Civil Defence". It embraces in the Federal Republic—as does the "Défense Civile" in France—not only general protection against bomb damage, but also all *non*-military defence preparations at national level. In official German usage, and at NATO, the expression "Zivile Notstandsplanung" (in English: "*Civil Emergency Planning*") is used for this. Among the army authorities and the public, however, the name "Zivile Verteidigung" is now generally used. Accordingly, the German translation of the British "Civil Defence" is "Ziviler Bevölkerungsschutz" or "Zivilschutz" for short.

A Comparison of the Strategic Position of Great Britain and of Germany

Between the geographical defence position—and thus the strategic positions—of Great Britain and the Federal Republic, there are considerable differences. Great Britain is an island, on which there are American nuclear rocket bases and RAF atomic deterrent-forces. In this country, therefore, no land fighting and, it is to be hoped, no attempts at invasion would take place in a future war. For this reason Great Britain would have to reckon with powerful enemy 'plane and rocket attacks, containing an element of surprise if possible, on the outbreak of war. "Home Defence" therefore really means "*Air* Defence".

In contrast to this, the Federal Republic, along the iron curtain, has more than a thousand miles of land frontiers in relation to the Moscow satellite States. On the outbreak of war, therefore, the Federal Republic would have to expect massed *land* attacks of superior enemy forces. The large increase of middle-distance rockets on the Soviet side (no warning period!) and the present still marked superiority of the Russian Air Force in Europe also constitute a considerable threat to the very centre of the Federal Republic in the event of war. Further, the Soviet forces could also carry out airborne and paratroop attacks, and fifth column activities behind the Federal lines.

The Tasks of the German National Defence Forces

The fighting troops of the Federal Defence Forces —so far, nine divisions—are integrated in NATO. The National German Land Defence Force consists of the military Territorial Defence Force and the Civil Defence Force. It is their task to carry out total mobilization of all military and civil auxiliary forces and thus to create the requisite support conditions for the NATO combat units. These tasks comprises:

(a) Support, in men and materials, of the fighting forces (drafting, transport, telecommunications, ambulance service, repairs, ground organization, and supplies).
(b) Maintenance of government authority at Federal, provincial, and municipal level.
(c) Civil Defence.
(d) Air defence of fixed installations.
(e) Preservation of natural resources.
(f) Decentralised storage of war materials and other vital materials.

Some of these national defence tasks fall to the military Territorial Command; others belong to the civil sector. Again, some of these tasks can only be solved by joint planning.

The Federalist State Organisation of the Federal Republic

In the case of the organisation and regional structure of British Civil Defence, certain disadvantages have arisen in that in England (excluding Wales) no internal, and administrative intermediate authorities exist. Admittedly, the Federal Republic is split up into provinces (and these, mostly into government or administrative districts), according to which the military territorial partition into commands has been carried out. But it is just this federalist organisation of Western Germany, which leaves a large measure of independence to the Federal provinces, that presents considerable difficulties in organising and preparing a Civil Defence Force.

The provinces carry out laws and regulations in connection with Civil Defence "by order of the Federation". So as to bind the boroughs to undertake the necessary local defence preparations, the provinces must first modify the Borough Regulations, issued around 1949, or enact special laws (as was recently done, for example, for the first time, in North-Rhine/Westphalia).

However, federalism does not have disadvantages only, in the setting up of Civil Defence measures in Germany: in cases of emergency, it also has a considerable advantage. On the outbreak of war, the continuity of the central Federal government could easily be upset, or at least interrupted for a time, by enemy action. In such a case, there are in the provinces, government districts, and sub-districts, operative State bodies which could provisionally take over the government authority on a regional basis.

Why Is Civil Defence in Arrear?

With the exception of a "First Law Concerning Measures for the Protection of the Civilian Population", of the 9th October, 1957, German Civil Defence still lacks the requisite legal foundations. Two important Laws, the Emergency Law (an amplification of the Basic Law, e.g. the German Constitution), and the Law Concerning Emergency War Service, were not passed by the Third "Bundestag" (Federal Government Assembly) and must now be reintroduced in the fourth "Bundestag", elected in September, 1961.

Apart from air raid precautions, which are receiving some attention and which, strange to say, have retained their name from the Second World War, only a few preparatory steps have so far been taken in the Federal Republic to secure and maintain vital traffic and signal communications.

Three essential reasons can be given for the present unpreparedness of Civil Defence compared with military defence:

1. The importance of setting up military combat units of the Federal fighting forces, for joint NATO defence.
2. The lack of adequate financial resources for the simultaneous, rapid build-up of Civil Defence (and yet the Federal expenditure on Civil Defence in 1961 came to a good 700 million DM, and will amount to about double this sum in 1962).
3. Phychological resistance on the part of the population and business interests.

It would be exceeding the scope of this article to go further into this important third point. Here, only a few causes for such resistance should be given, viz:

(a) The excessive demands made on the German people by the National Socialist regime during the war (not least in connection with air raid precautions).
(b) The complete collapse of the State in 1945.
(c) The unfortunate subsequent demilitarisation measures of the Occupying Powers.

And finally—

(d) the unpleasant psychological consequences of the German "economic miracle" (i.e. of the remarkable economic recovery of Western Germany).

Present Position of Civil Defence

Control and co-ordination of Civil Defence in the Federal Republic is the responsibility of the "Bundesinnenminister", and his functions correspond, more or less, to those of the British Home Secretary. In Germany, too, the main point of effort in Civil Defence preparations is concerned with protecting the civilian population. The already-mentioned First Law of 9th October, 1957 governs the tasks connected with civil air raid precautions; the air raid warning and alert services; the voluntary A.R.P. service; the (hitherto voluntary) co-operation of the population in A.R.P. work; the protection of cultural amenities; and the activity of the Federal civil air defence organisation which, apart from keeping the people informed, also has to deal with the training of voluntary helpers and the local individual defence organization.

The Law also contains detailed provisions concerning obligatory *construction of air raid shelters* in dwelling houses and industrial installations in the case of new buildings in towns of at least 10,000 inhabitants. As the 1957 Bonn Parliament could agree neither on the design of the air raid shelters nor on the financing of their construction, the coming into

force of the relevant paragraphs of the Law was held up. The settlement of the air raid shelter construction question was to be reserved for a Law to be issued later (by the 1st January, 1959). This question, however, still remains to be settled.

And so it is that, in the Federal Republic, for the (nearly) six million dwellings newly built after the war, there are *hardly any* air raid shelters. The same applies to the numerous new buildings and extensions in German industry, and to new public buildings (hospitals, schools, public utility organisations, transportation services, etc.). Only a small number of large public air raid shelters remaining from the Second World War are at present being reconditioned in some towns, and specially adapted to give protection against atomic bombs.

In the meantime, the Federal government has decided to restrict obligatory construction in general to solidly-built air raid shelters for protection against radio-active 'fallout'; and only to provide stronger air raid shelters in the so-called "vulnerable areas", i.e. in towns with more than 50,000 inhabitants. These stronger shelters can stand a medium-intensity blast and the heat-radiation of an atomic explosion. But as long as these plans are unrealised (it is estimated that they would cost about 25 million DM), the state of Civil Defence in Western Germany must remain inadequate.

The second difficult problem is the *lack of volunteers,* both in the voluntary A.R.P. service and in the individual defence organisations. It is true that the Federal civil air defence organisation has recruited about 150,000 volunteers so far, for this individual defence organisation; but in the event of war, about five or six times as many would be needed. In the Federal Republic, the scope of individual defence is wider than in Great Britain. Until further notice, the individual defence organisation is responsible for local air precaution in medium-size and small towns, as well as in the country. The same applies to industrial concerns with up to 200 employees, and to public administrations which belong to the so-called "extended individual defence organization".

In some hundred German large and medium-sized towns, in which urgent public protective measures are thought to be necessary, a communal local voluntary A.R.P. service is soon to be created. At present a supra-local voluntary A.R.P. service is being organised, which the provinces themselves have to set up for emergency use in the case of extensive bomb damage. The total strength of this voluntary A.R.P. service, whose tasks roughly correspond to those of the British Civil Defence Corps, is estimated at about 300,000 officers and other ranks, of which some 90,000 belong to the supra-local units. For these, however, only 18,000 volunteers have so far come forward, who belong preponderantly to the following bodies: the Red Cross; the "Johanniter-und Malteser-Orden" (*Knights of St. John and Maltese Orders*); "Technisches Hilfswerk" (= a relief organisation); and charitable associations, with whose help, originally, both the "Hilfsdienst" (*voluntary national service*) and the individual defence organisations were to be set up on an exclusively voluntary basis.

The lack of volunteers in the voluntary national service and individual defence organisations caused the Federal government last year to envisage *compulsory service* for the missing volunteers, within the framework of an emergency service regulation. Here, persons belonging to the so-called "white age-class" (1928-1937), subject to draft, who have done no national service, are first of all to be recruited for urgent national service. But the Emergency Service Law was not passed by the third "Bundestag". It is now to be newly discussed by the fourth "Bundestag", probably in the form of an extension to a Civil Defence Law.

The structure of the German voluntary A.R.P. service is also similar to that of the British Civil Defence Corps. So-called "reserve units" for the fire-fighting, salvage, ambulance and veterinary, "ABC", welfare, planning and social, and tele-communications services are being organised. The supra-local national service reserve units are to be combined into mixed A.R.P. units.

Preparations for *evacuating* the people from the large towns and industrial centres—in Great Britain, a vital part of Civil Defence—are still in the planning stage in Germany. The following is envisaged: evacuation from town centres of mothers, children, and old and sick persons, and their accommodation in alternative quarters, which are situated about 20-60 km from the home town. The first evacuation exercises are soon to take place.

Air raid protection for industrial installations does not yet exist in practice. According to the original government plan, this was to be organised on the industrial sector on a voluntary individual defence basis, and at the expense of the industrial organisations concerned. Special State protection was to be afforded only in the case of vital industries and those important to the war effort. Industrial interests are demanding tax concessions and permission to make suitable write-offs for organising individual air defence and constructing air raid shelters (in connection with which, as already mentioned, there is no compulsion). But the Federal Finance Minister has so far refused to authorise such concessions.

The negotiations between the Federal Minister for Economic Affairs and the Federal "Home Secretary", who are jointly responsible for industrial air raid precautions, and the A.R.P. Working Committee for Industry", which only has an advisory function, have already been going on for years without any concrete result. Thus, the lack of industrial protection is the third deficiency of the German Civil Defence organisation.

On the other hand, considerable advances have recently been made in the provision of medicines, bandages, and medical equipment. These have been distributed among a fairly large number of stores (100) and those auxiliary hospitals which have so far been made ready (400). Further, there are in the Federal territory 55 control stations for measuring *radio-activity* with altogether about 1,200 recording centres.

Finally, the warning and alert service is gradually being organised. The ten underground Federal warning centres, which have been provided, are, in essentials, ready for operation. It is true that there are as yet no signal communications to some important alarm centres (authorities and industrial installations). Of the 30,000 sirens required for the Federal territory, some 6,000 are ready for action.

To sum up: Much still remains to be done on the Civil Defence sector in the Federal Republic, particularly with regard to the protection of the population. But the new Federal government and the fourth "Bundestag" have frequently expressed their firm intention of catching up with the backlog of work, and in particular of speeding up Civil Defence preparations.

These efforts come halfway to meet the growing psychological defence awareness of the population. Since the 13th August, 1961—the day on which the "Red" wall was built across Berlin—the citizens of Free Germany have understood that the protection of their freedom demands not only soldiers but also Civil Defence workers. ▲

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The following statement by the United States Secretary of Defense Robert S. McNamara on the fiscal years 1963-67 defense programme and the 1963 civil defense budget was made before the Senate Committee on Armed Services on January 19, 1962:

"I believe it is quite clear from what I have said earlier, in my discussion of the Continental Air and Missile Defense Forces, that a 100% effective system of military defense against ICBM's and submarine-launched missiles is technically impossible. At least during the period 1963 through 1967 we will have to rely for our survival on a combination of military and civil defense measures. Last year President Kennedy announced a new national program for civil defense and transferred primary responsibility for the Federal Government's share of that programme to the Department of Defense. He pointed out at that time that appropriations for civil defense in 1962 would have to triple the level of prior years and would increase sharply thereafter. This, indeed, has been the case and we are now asking for this purpose in fiscal year 1963, a total of almost $700 million."

Weather and Emergency Planning

The following article was prepared for the DIGEST *by* G. H. GILBERT,
Meteorological Adviser to the Defence Research Board.

Introduction

The immediate hazards resulting from nuclear explosions are due to the effects of blast, of heat and of initial ionizing radiation. Since these effects are transmitted through the atmosphere it is fairly evident that the resulting hazards will be conditioned to some extent by the state of the atmosphere i.e. by the weather. In addition, the radioactive clouds containing the debris of such explosions will be transported by the winds and will subsequently result in the deposition of the radioactive debris over large areas.

It is the purpose of this article to indicate the extent to which the various hazards resulting from nuclear explosions may be conditioned by the weather. Particular attention will be paid to the wind since this appears to be the one aspect of the weather that has the greatest effect on the hazards involved. An account will also be given of the way in which a day to day knowledge and a climatological knowledge of the wind may be used in emergency planning.

Weather and Blast Hazard

Blast waves tend to be affected by atmospheric conditions in much the same way as sound waves are affected. Hence, for explosions taking place at ground level, one would expect some enhancement of the blast hazard under conditions of better than average audibility, and some decrease in the blast hazard under conditions of poor audibility. Thus, there would tend to be some enhancement of the blast hazard at night or early morning when the weather is clear and still. On the other hand the hazard would be less on hot days and on days of rain or strong winds. The wind would also tend to give rise to an asymmetrical area of blast, elongated in the downwind direction and shortened somewhat in the upwind direction. However, the overall influence of the weather is likely to be small close to the centre of the explosion, but could be quite significant in out-lying areas.

Certain weather conditions may also give rise to anomalous blast damage at distances *well* beyond the normal range of damage. For example, a certain number of the kiloton explosions at the Nevada Proving Ground in 1951 resulted in damage to plaster and glass at Las Vegas some 80 miles away. In the case of an explosion in the megaton range such anomalous effects could give rise to quite severe but localized damage at distances up to 40 to 50 miles from the explosion, and lesser damage out to about twice that distance.

Weather and Thermal Hazard

Thermal radiation from a nuclear explosion will be affected by much the same atmospheric conditions as the thermal radiation from the sun. Thus, one would expect the thermal hazard to be much reduced when the weather is foggy or when it is raining or snowing, the reduction being relatively much greater in out-lying areas than in areas close to the centre of the explosion.

The thermal hazard would also be much reduced in the case of a nuclear explosion taking place *above* an extensive cloud layer. However, if the explosion were to take place *below* an extensive cloud layer, the thermal hazard is likely to be enhanced because of the added contribution due to reflection from the underside of the cloud layer.

Weather and Radiological Hazard

The distance at which *initial* ionizing radiation ceases to be a hazard depends upon the density of the air, and in this respect, one would expect the hazard to be slightly less in fine weather than in stormy weather. However, the effect on the radiological hazard from this cause is so slight that it can usually be neglected.

Residual radiation resulting from fallout, on the other hand, is due to the deposition of radioactive material that has been transported a considerable distance by the wind. The areas affected by such radioactive fallout will therefore depend almost entirely on the wind pattern prevailing at the time. The amount of radioactive material deposited will be determined by the size and nature of the explosion, but the weather will also have some effect, the amount deposited being greater in areas where it happens to be raining or snowing than in other areas. In the case of an explosion in the megaton range that takes place close to the ground, the amount of radioactive material deposited may be such as to result in a radiological hazard over thousands of square miles.

Winds and Fallout

The falling debris giving rise to radioactive fallout will be affected by the winds in the various layers of the atmosphere through which the debris is falling. The areas subject to a radiological hazard due to fallout will therefore depend, not only on the winds near the surface, but on the winds throughout a fairly deep layer of the atmosphere.

It is sometimes convenient to think of an 'effective wind' that has the same effect on falling particles as all

the winds in the various layers through which the particles are falling. For example, if the base of the radioactive cloud happened to be at 60,000 ft., and the 60,000 ft. 'effective wind' on that particular day was from the north-west, one would expect the debris from near the base of the cloud to result in a trail of radioactive fallout towards the south-east. If the top of the radioactive cloud extended to 90,000 ft., and the 90,000 ft. 'effective wind' on the some day was from the west, one would expect the debris from near the top of the cloud to give a similar trail towards the east. In such a case it is fairly evident that fallout from the *entire* cloud would be contained within the sector bounded by the east and south-east azimuths. From the point of view of possible radiological hazard this sector could therefore be considered as a 'danger sector'.

Meteorological Information Available

Observations of upper level winds are made twice daily from a network of weather stations in Canada and the United States. At some stations the observations are made as often as four times a day. All of this information is made available to the main weather offices across the country, and the data plotted on appropriate weather maps. These maps are then projected into the future in order to obtain a picture of the wind distribution some 24 hours or so in advance. Hence, in addition to current information on upper level winds in the atmosphere, information is also available regarding the probable winds in the near future.

Observations of upper level winds have been made over quite a number of years, and these data have been collected and summarized. From such summaries it is possible to determine for any particular location the frequency of winds blowing from the various directions, either season by season or for the year as a whole.

Prediction of Fallout

It is fairly evident from the foregoing that forecasts of upper level winds may be used to deduce the appropriate 'effective winds' from which a prediction can be made of the sector of possible radiological hazard due to fallout.

One of the responsibilities of the Canadian Army in the event of a nuclear attack is the giving of the necessary warning of fallout to the public. To assist the Army in this role, special forecasts of upper level winds for a selected number of target cities are prepared twice daily by the Meteorological Service of Canada. These forecasts are transmitted to Warning Centres across the country where the appropriate information is plotted and the 'effective winds' and the fallout sector determined for each target of interest. In addition, the speed of the 'effective winds' is used as a basis for delineating within the sector two zones of radiological hazard, the first being the area of immediate concern and the second the area of moderate risk. The speed of the winds is also used to determine the probable time of onset of the hazard due to fallout.

Planning Against Fallout

Wind information accumulated over the years may be used to determine for any particular 'target' city the most frequent direction of the 'effective winds', and this information may be used in turn to determine the sector most likely to be affected by fallout in the event of a nuclear attack on that city. For example, the most probable orientation of the fallout sector over eastern Canada would be towards the east, and towards a little south of east for central Canada; over British Columbia the most probable orientation would be towards a little south of east in winter, and towards a little north of east in summer. Because of the variability of wind from day to day, planning which is based on the most probable sector affected by fallout would be of little value if no account were taken of the possibility of fallout in other sectors. However, by considering the frequency of winds from different directions it is possible to assess the relative hazard in the various sectors. It would also be possible to determine the overall sector which would have, say, a 90% probability of including the fallout in event of a nuclear attack on the city concerned. Such a sector for Southwestern Ontario would have an angular extent of about 100 degrees in summer and about 70 degrees in winter.

Conclusions

Weather must be an important consideration in any emergency planning. The necessity of having an immediate capability for the prediction of fallout in order to be able to give the necessary warning of fallout to the public is evident. In this respect, because of the rapidity with which the weather may change at times, it is desirable that this capability include the services of a weather forecaster. For certain other aspects of emergency planning where the radiological hazard due to fallout may be a consideration, climatological summaries of wind can be used to provide some indication of the relative hazard as between one area and another. Such information would provide useful guidance, for example, in determining the most suitable location for emergency supplies and medical stock piles, and the most suitable bases for supporting operations in the event of a nuclear attack.

Anomalous blast effects are relatively unimportant compared with the blast hazard about the centre of the explosion, but, they may well be misinterpreted as being due to another but smaller nuclear explosion. Although such anomalous effects cannot be forecast with any degree of accuracy with the information normally available, the weather forecaster could give a fairly reliable indication whether a doubtful report was in fact due to anomalous effects or not. ▲

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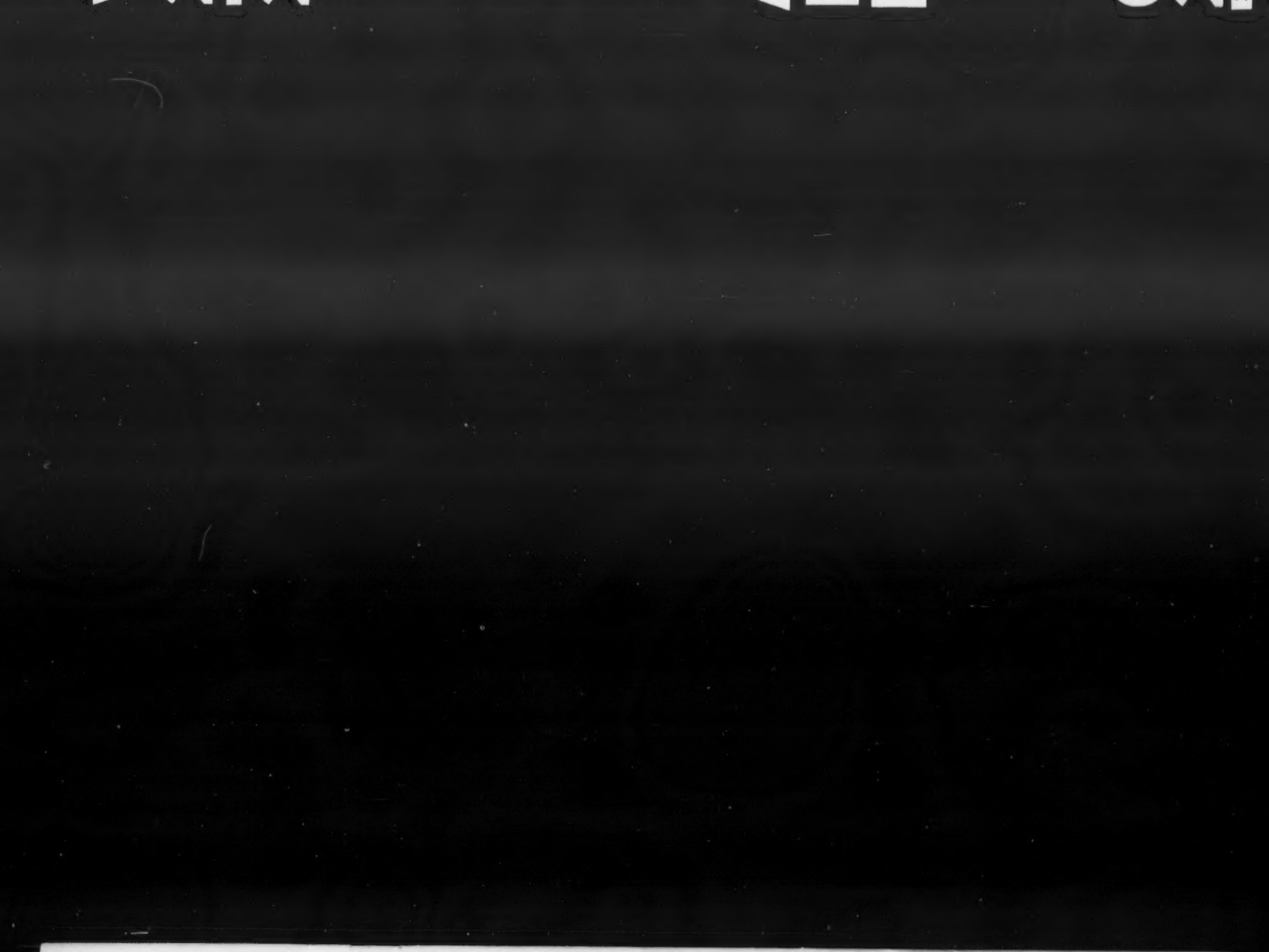
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